

4-6
66-

This Page Is Inserted by IFW Operations
and is not a part of the Official Record

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- BLACK BORDERS
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

IMAGES ARE BEST AVAILABLE COPY.

**As rescanning documents *will not* correct images,
please do not report the images to the
Image Problem Mailbox.**

FIG. 1.
JDF-3 DNA polymerase nucleotide sequence: 2331 nucleotides (SEQ ID NO: 1)

ATGATCCTTGACGTTGATTACATCACCGAGAATGGAAAGCCCGTCATCAGGGTCTTCAAGAAGGAGAACGG
CGAGTTCAGGATTGAATACGACCGCGAGTTCGAGCCCTACTTCTACGCGCTCCTCAGGGACGACTCTGCCA
TCGAAGAAATCAAAAAGATAACCGCGGAGAGGCACGGCAGGGTCGTTAAGGTTAAGCGCGCGGAGAAGGTG
AAGAAAAAGTTCTCTCGGCAGGTCTGTGGAGGTCTGGGTCTCTACTTCACGCACCCGCAGGACGTTCCGGC
AATCCGCGACAAAATAAGGAAGCACCCCGCGTTCATCGACATCTACGAGTACGACATACCCTTCGCCAAGC
GCTACCTCATAGACAAGGGCCTAATCCCGATGGAAGGTGAGGAAGAGCTTAAACTCATGTCCTTCGACATC
GAGACGCTCTACCACGAGGGAGAAGAGTTTGGAAACCGGGCCGATTCTGATGATAAGCTACGCCGATGAAAG
CGAGGCGCGCGTGATAACCTGGAAGAAGATCGACCTTCCTTACGTTGAGGTTGTCTCCACCGAGAAGGAGA
TGATTAAGCGCTTCTTGAGGGTCGTTAAGGAGAAGGACCCGGACGTGCTGATAACATAACGGCGACAAC
TTCGACTTCGCCTACCTGAAAAAGCGCTGTGAGAAGCTTGGCGTGAGCTTTACCCTCGGGAGGGACGGGAG
CGAGCCGAAGATACAGCGCATGGGGGACAGGTTTGCGGTCGAGGTGAAGGGCAGGGTACACTTCGACCTTT
ATCCAGTCATAAGGCGCACCATAAACCTCCCGACCTACACCCTTGAGGCTGTATACGAGGCGGTTTTTCGGC
AAGCCCAAGGAGAAGGTCTACGCCGAGGAGATAGCCACCGCCTGGGAGACCGGGCAGGGGCTTGAGAGGGT
CGCGCGCTACTCGATGGAGGACGCGAGGGTTACCTACGAGCTTGGCAGGGAGTTCTTCCCGATGGAGGCC
AGCTTTCAGGCTCATCGGCCAAGGCCTCTGGGACGTTTCCCGCTCCAGCACCGGCAACCTCGTCGAGTGG
TTCTCCTAAGGAAGGCCCTACGAGAGGAACGAACCTCGCTCCCAACAAGCCCGACGAGAGGGAGCTGGCGAG
GAGAAGGGGGGGCTACgCGGTGGCTACGTCAAGGAGCCGGAGCGGGGACTGTGGGACAATATCGTGATC
TAGACTTTCGTAGTCTCTACCCTTCAATCATAATCACCCACAACGTCTCGCCAGATACGCTCAACCGCGAG
GGGTGTAGGAGCTACGACGTTGCCCCCGAGGTCGGTCACAAGTTCTGCAAGGACTTCCCGGCTTCATTCC
GAGCCTGCTCGGAAACCTGCTGGAGGAAAGGCAGAAGATAAAGAGGAAGATGAAGGCAACTCTCGACCCGC
TGGAGAAGAATCTCCTCGATTACAGGCAACGCGCCATCAAGATTCTCGCCAACAGCTACTACGGCTACTAC
GGCTATGCCAGGGCAAGATGGTACTGCAGGGAGTGCGCCGAGAGCGTTACGGCATGGGGAAGGGAGTACAT
CGAAATGGTCATCAGAGAGCTTGAGGAAAAGTTTCGGTTTTAAAGTCCTCTATGCAGACACAGACGGTCTCC
ATGCCACCATTCTTGGAGCGGACGCTGAAACAGTCAAGAAAAGGCAATGGAGTTCTTAAACTATATCAAT
CCCAAAGTCCCCGGCCTTCTCGAACTCGAATACGAGGGCTTCTACGTACGGGGCTTCTTCGTACGAAGAA
AAAGTACGCGGTCTACGACGAGGAGGGCAAGATAACCACGCGCGGGCTTGAGATAGTCAGGCGCGACTGGA
GCGAGATAGCGAAGGAGACGCAGGCGAGGGTTTTGGAGGCGATACTCAGGCACGGTGACGTTGAAGAGGCC
GTCAGAATTGTGAGGGAAGTCACCGAAAAGCTGAGCAAGTACGAGGTTCCGCCCGGAGAAGCTGGTTATCCA
CGAGCAGATAACGCGCGAGCTCAAGGACTACAAGGCCACCGGCCGCACGTAGCCATAGCGAAGcGTTTGG
CCGCCAGAGGTGTTAAAATCCGGCCCGGAACTGTGATAAGCTACATCGTTCTGAAGGGCTCCGGAAGGATA
GGCGACAGGGCGATTCCCTTCGACGAGTTCGACCCGACGAAGCACAAAGTACGATGCGGACTACTACATCGA
GAACCAGGTTCTGCCGGCAGTTGAGAGAATCCTCAGGGCCTTCGGCTACCGCAAGGAAGACCTGCGCTACC
AGAAGACGAGGCAGGTCGGGCTTGGCGCGTGGCTGAAGCCGAAGGGGAAGAAGAAGTGA

FIG. 2.
JDF-3 DNA polymerase amino acid sequence (SEQ ID NO: 2)
Theoretical molecular weight: 90.3 kD

MILDVDYITENGKPVIRVFKKENGFEFRIEYDREFEPYFYALLRDDS AIEEIKKITAERHGRVVKVKRAEKV
KKKFLGRSVEVWVLYFTHPQDVPAIRDKIRKHPAVIDIYEDIPFAKRYLIDKGLIPMEGEEELKILMSFDI
ETLYHEGEEFGTGPIILMISYADESEARVITWKKIDLPYVEVVSTEKEMIKRFLRVVKEKDPDVLITYNGDN
FDFAYLKKRCEKLGVSFTLGRDGSEPKIQRMGDRFAVEVKG RVHFDLYPVIRRTINLPTYTLEAVYEAVFG
KPKEKVYABEIATAWETGEGLE RVARYSMEDARVTYELGREFFPMEAQLSRLIGQGLWDVSRSTGNLVEW
FLLRKAYERNELAPNKPDERELARRRGYAGGYVKEPERGLWDNIVYLDFRSLYPSIIITHNVSPDTLNRE
GCRSYDVAPEVGHKFCDFPGFIPSL LGNLLEERQKIKRKMKATLDPLEKNLLDYRQRAIKILANSYYGY
GYARARWYCRECAESVTAWGREYIEMVIRELEEKFGFKVLYADTDGLHATIPGADAETVKKKAMEFLNYIN
PKLPGLLELEYEGFYVRGFFVTKKKYAVIDEEGKITTRGLEIVRRDWSEIAKETQARVLEAILRHGDVEEA
VRIVREVTEKLSKYEVPPEKLVIHEQITRELKDYKATGPHVAIAKRLAARGVKIRPGTVISYIVLKGSGRI
GDRAIPDEFDPTKHKYDADYYIENQVLP AVERILRAFGYRKEDLRYQKTRQVGLGAWLKPKGKKK

bioRxiv preprint doi: <https://doi.org/10.1101/000000>; this version posted January 1, 2014. The copyright holder for this preprint (which was not certified by peer review) is the author/funder, who has granted bioRxiv a license to display the preprint in perpetuity. It is made available under aCC-BY-NC-ND 4.0 International license.

FIG. 3.

JDF-3 DNA polymerase with intein sequence (SEQ ID NO: 3)

MILDVDYITENGKPVIRVFKKENGEFRIEYDREFEPYFYALLRDDS AIEE
 IKKITAERHGRVVKVKRAEKVKKKFLGRSVEVWVLYFTHPQDVPAIRDKI
 RKHPAVIDIYEDIPFAKRYLIDKGLIPMEGEEELKLM SFDIETLYHEGE
 EFGTGPILMISYADESEARVITWKKIDLPYVEVVST EKEMIKRFLRVVKE
 KDPDVLITYNGDNFDFAYLKKRCEKLGVSFTLGRD GSEPKIQRMGDRFAV
 EVKGRVHFDLYPVIRRTINLPTYTLEAVYEAVFG KPKEKVYAE EIIATAWE
 TGEGLERVARYSMEDARVTYELGREFFPMEAQLS RLIGQGLWDVSR SSTG
 NLVEWFLLRKAYERNELAPNKPDERELARRRGGY AGGYVKEPERGLWDNI
 VYLDFRSLYPSIIITHNVSPDTLNRGCRSYDVAPE VGHKFKCKDFPGFIP
 SLLGNLLEERQKIKRKM KATLDPLEKNLLDYRQRAIKILAN

Extein 1

SLLPGEWVA
 VIEGGKLRPVIRIGELVDGLMEASGERVKRDGDTEV LEVEGLYAS PSTGSP
 RKPAQCR*KP**GTAMPGKFTE*LSTPEGGLSVTRG HSLFAYRDASLWR*
 RGRRRFKPGDLLAVPSG*PSRRGGRGSTSLNCSS NCPRKRPTCHRHSGK
 GRKNFFRGMLRTLRLWIFGEEKTGGRPGATWSTLR GLGYVKLRKIGYGVVD
 REGLGKVPRFYERLVEVIRYNGNRGEFIADFNALR PVLRLMMPEKELEEW
 LVGTRNGFRIRPFIEVDWKFAKLLGYVSEGSAGK WKNRTGGWSYSVRLY
 NEDGSVLDDMERLARSSLGA*ARGELRRDFKEDGL HNLRGALRFTGREQE
 GSVAYLHVP*GGPLGLP*GVLHRRRRRSPEQDGS ALHQERASG*RPRPAP
 ELAGRLSDKRPPRQRLQGLRERGTALYRVPEAEER LTYSHVIPREVLEE
 TSAGPSRRT*VTGNSGSWWKAGSSTRKGPVG*AGS STGI*SSTGSRKSGR
 KATRGTTST*ALRRTRTSGGLWVPLRAQX

Intein 1

SYYGYYGYARARWYCRECAES
 VTAWGREYIEMVIRELEEKFGFKVLYADTDGLH ATIPGADAETVKKKAME
 FLNYINPKLPGLLELEYEGFYVRGFFVTKKKYAVID EEGKITTRGLEIVR
 RDWSEIAKETQARVLEAILRHGDVEEAVRIVREVTE KLSKYEVPPEKLVI
 HEQITRELKDYKATGPHVAIAKRLAARGVKIRPGTV ISYIVLKGSGRIGD
 RAIPFDEFDPTKHKYDADYYIENQVLP AVERILRAFGYRKEDLRYQKTRQ
 VGLGAWLKPKGKKK

Extein 2

FIG. 4.
JDF-3 DNA polymerase genomic sequence (SEQ ID NO: 4)

AATTCCACTGCCGTGTTTAACCTTTCCACCGTTGAACTTGAGGGTGATTT
TCTGAGCCTCCTCAATCACTTAATCGAGACCGCGGATTACCTTGAACTGG
TACACGTTCAACGATTTCGGTTCCTTGTAAATGGTCGATACTGGGCCGTGCTG
GATTTTCTAAACGTCTCAAGAACGGCTTTTCATCAACGGAACTGCCACGT 5' untranslated sequence
CTCCGCCGTCTGAGGGTTAAACCTGAAGTTCAAGACTTTGCAACGGAAT
GGCGAGAGAACGGCGACTACCCAGTGGAAAGAGCTTTTGAAAGCCAAAGC
CGAGCTTCAGCGAATGTGCGGTGCCCTTGTTCAGAGTTGTGAGCCCTTG
ATTGTTGTTTTCTCCTCTTTTCTGATAACATCGATGGCGAAGTTTATTAG
TTCTCAGTTCGATAATCAGGCAGGTGTTGGTC

ATGATCCTTGACGTTGAT
TACATCACCGAGAATGGAAAGCCCGTCATCAGGGTCTTCAAGAAGGAGAA
CGGCGAGTTTCAAGATTGAATACGACCGCGAGTTTCGAGCCCTACTTCTACG
CGCTCCTCAGGGACGACTCTGCCATCGAAGAAATCAAAAAGATAACCGCG
GAGAGGCACGGCAGGGTCGTTAAGGTTAAGCGCGCGGAGAAGGTGAAGAA
AAAGTTCCTCGGCAGGTCTGTGGAGGTCTGGGTCTCTACTTCACGCACC
CGCAGGACGTTCCGGCAATCCGCGACAAAATAAGGAAGCACCCCGCGGTC
ATCGACATCTACGAGTACGACATAACCTTCGCCAAGCGCTACCTCATAGA
CAAGGGCCTAATCCCGATGGAAGGTGAGGAAGAGCTTAACTCATGTCCT
TCGACATCGAGACGCTCTACCACGAGGGAGAAGAGTTTGGAAACCGGGCCG
ATTCTGATGATAAGCTACGCCGATGAAAGCGAGGCGCGCGTGATAACCTG
GAAGAAGATCGACCTTCTTACGTTGAGGTGTCTCCACCGAGAAGGAGA
TGATTAAGCGCTTCTTGAGGGTCGTTAAGGAGAAGGACCCGGACGTGCTG
ATAACATACAACGGCGACAACCTTCGACTTCGCCTACCTGAAAAAGCGCTG
TGAGAAGCTTGGCGTGAGCTTTACCCCTCGGGAGGGACGGGAGCGAGCCGA Extein 1
AGATAACAGCGCATGGGGGACAGGTTTTCGCGTTCGAGGTGAAGGGCAGGGTA
CACTTCGACCTTTATCCAGTCATAAGGCGCACCATAAACCTCCCGACCTA
CACCCTTGAGGCTGTATACGAGGCGGTTTTTCGGCAAGCCCAAGGAGAAGG
TCTACGCCGAGGAGATAGCCACCGCCTGGGAGACCGGCGAGGGGCTTGAG
AGGGTCGCGCGCTACTCGATGGAGGACGCGAGGGTTACCTACGAGCTTGG
CAGGGAGTTCTTCCCGATGGAGGCCCAGCTTTCAGGGCTCATCGGCCAAG
GCCTCTGGGACGTTTCCCGCTCCAGCACCGGCAACCTCGTCGAGTGGTTC
CTCCTAAGGAAGGCCCTACGAGAGGAACGAACCTCGCTCCCAACAAGCCCGA
CGAGAGGGAGCTGGCGAGGAGAAGGGGGGGCTACGCCGTTGGCTACGTCA
AGGAGCCGGAGCGGGGACTGTGGGACAATATCGTGTATCTAGACTTTCGT
AGTCTCTACCCTTCAATCATAATCACCACAACGTCTCGCCAGATACGCT
CAACCGCGAGGGGTGTAGGAGCTACGACGTTGCCCGGAGGTTCGGTCACA
AGTTCTGCAAGGACTTCCCGGCTTCATTCCGAGCCTGCTCGGAAACCTG
CTGGAGGAAAGGCAGAAGATAAAGAGGAAGATGAAGGCAACTCTCGACCC
GCTGGAGAAGAATCTCCTCGATTACAGGCAACGCGCCATCAAGATTCTCG
CCAAC

AGCCTTCTTCCCGGGGAGTGGGTTGCGGTCATTGAAGGGGGGAAA
CTCAGGCCCGTCCGCATCGGCGAGCTGGTTGATGGACTGATGGAAGCCAG
CGGGGAGAGGGTGAAAAGAGACGGCGACACCGAGGTCCTTGAAGTCGAGG
GGCTTTACGCCTCTCCTTCGACAGGGAGTCCAAGAAAGCCCGCACAAATGC
CGGTGAAAGCCGTGATAAGGCACCGCTATGCCGGGGAAGTTTACAGAATA
GCTCTCAACTCCGGAAGGAGGATTAAGCGTGACGCGCGGCCACAGCCTCT
TCGCGTACCGGGACGCGAGCTTGTGGAGGTGACGGGGAGGAGGAGGTTTC
AAGCCCGGCGACCTCCTGGCGGTGCCAAGCGGATAACCCTCCCGGAGAGG
Intein 1

AGGGAGAGGCTCAACATCGTTGAACTGCTCCTCGAACTGCCCCGAGGAGGA
AACGGCCGACATGTCATCGACATTCCGGCAAGGGTAGAAAGAACTTCTTC
AGGGGAATGCTCAGAACCCCTCCGCTGGATTTTCGGGGAGGAGAAGACCGG Intein 1
AGGGCGGCCAGGCGCTACCTGGAGCACCTTGCGTGGGCTCGGCTACGTGA
AGCTGAGGAAAATCGGCTACGGGGTGGTTGATAGGGAGGGACTGGGAAAG
GTACCGCGCTTCTACGAGAGGCTCGTGGAGGTAATCCGCTACAACGGCAA
CAGGGGGGAGTTCATCGCCGATTTCAACGCGCTCCGCCCCGTCTCCGCC
TGATGATGCCCCGAGAAGGAGCTTGAAGAGTGGCTCGTTGGGACGAGGAAC
GGGTTTCAAGATAAGGCCGTTTCATAGAGGTTGATTGGAAGTTTCGAAAGCT
CCTCGGCTACTACGTGAGCGAGGGGAGCGCCGGGAAGTGGAAAAACCGGA
CCGGGGGCTGGAGCTACTCGGTGAGGCTTTACAACGAGGACGGGAGCGTT
CTCGACGACATGGAGAGACTCGCGAGGAGTTCTTTGGGGGCGTGAGCGCG
GGGGGAACACGTGAGATTTCAAAGAAGATGGCCTACATAATCTTCGAG
GGGCTCTGCGGTTACCGGCCGAGAACAAAGAGGGTCCGTGGCTTATCTT
CACGTCCCCTGAGGAGGTCCGCTGGGCCTTCCTTGAGGGGTACTTCATCG
GCGACGGCGACGTTACCCGAGCAAGATGGTTCGGCTCTCCACCAAGAGC
GAGCTTCTGGCTAACGGCCTCGTCTGCTCCTGAACTCGCTGGGCGTCTC
AGCGATAAACGTCCGCCACGACAGCGGGGTTTACAGGGTCTACGTGAACG
AGGAAGTGCCTTTACAGAGTACCGGAAGCGGAAGAACGCCTCACTTACT
CCCACGTACATCCGAGGGAAGTGCTGGAGGAGACTTCGGCCGGGCCTTCC
AGAAGAACATGAGTCACGGGAAATTCAGGGAGCTGGTGGAAAGCGGGGAG
CTCGACGGGAAAGGGCCGGTAGGATAGGCTGGCTCCTCGACGGGGATAT
AGTCTCGACAGGGTCTCGGAAGTCAGGAAGGAAAGCTACGAGGGGTACG
TCTACGACCTGAGCGTTGAGGAGGACGAGAACTTCTGGCGGGCTTTGGGT
TCCTCTACGCGCACAAACNN

AGCTACTACGGCTACTACGGCTATGCCAGGG
CAAGATGGTACTGCAGGGAGTGCGCCGAGAGCGTTACGGCATGGGGAAAGG
GAGTACATCGAAATGGTCATCAGAGAGCTTGAGGAAAAGTTCCGTTTTAA
AGTCCTCTATGCAGACACAGACGGTCTCCATGCCACCATTCTGGAGCGG
ACGCTGAAACAGTCAAGAAAAAGGCAATGGAGTTCTTAAACTATATCAAT
CCCAAAGTGCCTCGGCTTCTCGAACTCGAATACGAGGGCTTCTACGTCAG
GGGCTTCTTCGTACGAAAGAAAAAGTACGCGGTATCGACGAGGAGGGCA
AGATAACCACGCGCGGGCTTGAGATAGTCAGGCGCGACTGGAGCGAGATA
GCGAAGGAGACGCGAGGCGAGGGTTTTGGAGGCGATACTCAGGCACGGTGA Extein 2
CGTTGAAGAGGCCGTGAGAAATGTCAGGGAAGTACCGAAAAGCTGAGCA
AGTACGAGGTTCCGCCGAGAGAGTGGTTATCCACGAGCAGATAACGCGC
GAGCTCAAGGACTACAAGGCCACCGGCCGACGTAGCCATAGCGAAGCG
TTTGCCGCCAGAGGTGTTAAAATCCGGCCCGGAACTGTGATAAGCTACA
TCGTTCTGAAGGGCTCCGGAAGGATAGGCGACAGGGCGATTCCCTTCGAC
GAGTTCGACCCGACGAAGCACAAAGTACGATGCGGACTACTACATCGAGAA
CCAGGTTCTGCCGCGAGTTGAGAGAATCCTCAGGGCCTTCGGCTACCGCA
AGGAAGACCTGCGCTACCAGAAGACGAGGCAGGTGGGCTTGCGCGGTGG
CTGAAGCCGAAGGGGAAGAAGAAGTGA

GGAATTATCTGGTTTTCTTTTCCC
AGCATTAATGCTTCCGACATTGCCTTATTTATGAACTCCTGTTGTGCC
TGAGTTTGTGCCAGAAAACAGCCTGTTCTGACGGCGCTTTTTCTTGCCAG
GTCTCTTGAGTTTCGCAAGGGTCTTCTCGACAGCTCAATGGTCTTGTCTG
TCATTGTTTNNNNNNNNNNNNNNNNNNNNNNCCGGGGACTTCATACTGGC
GGTAATAGACAGGGATTCTTCTCAAGGACTTCCCGGGAGGCATTGGAG
TTTTTTGGTGGGGCTTTCACAGGATTGCTCATCTTGTGGATTTCTCGTT
CGATTGAATCTGTCCACTTGAGGGTGTAGGTGAGACGGTGGAGCGCGTA

[illegible]

Preliminary Qualification of Mutants

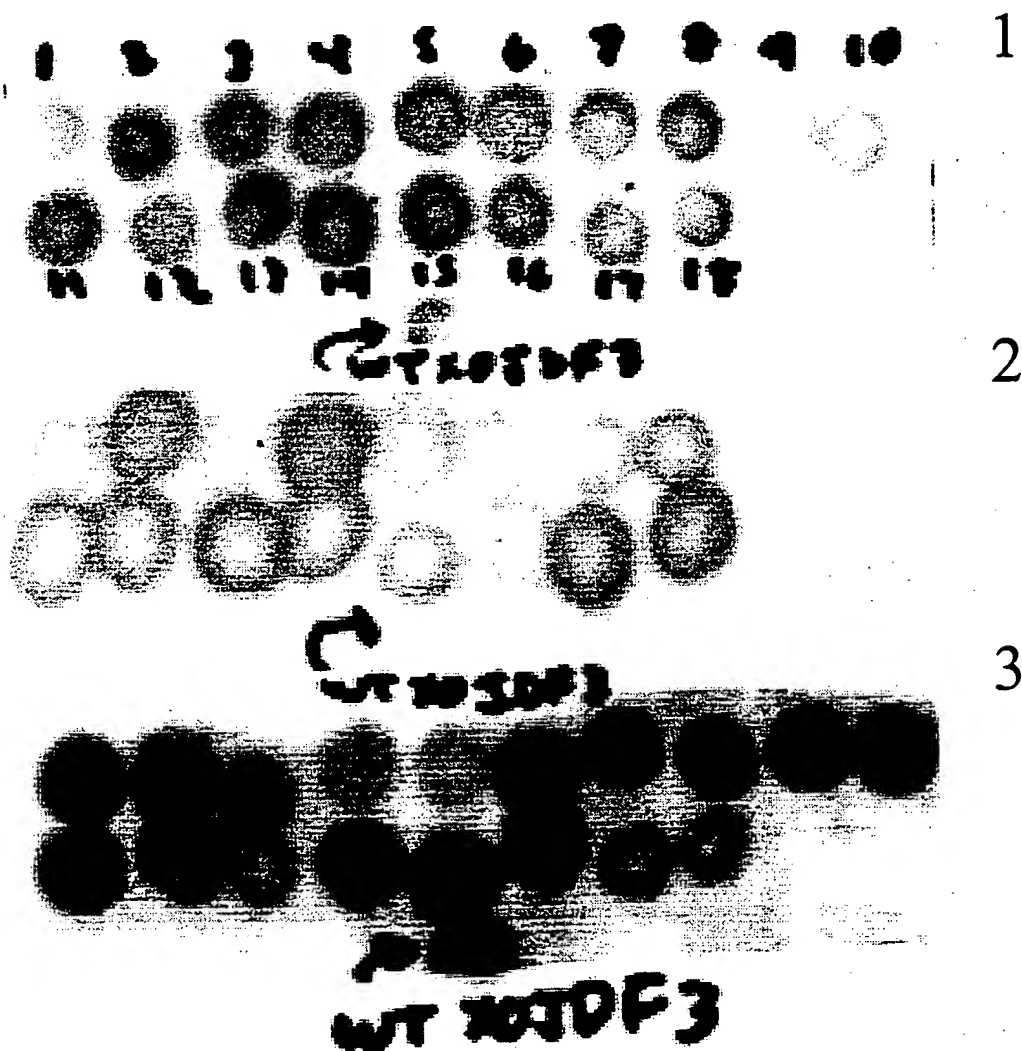


Figure 5

Sequencing with Purified Mutants

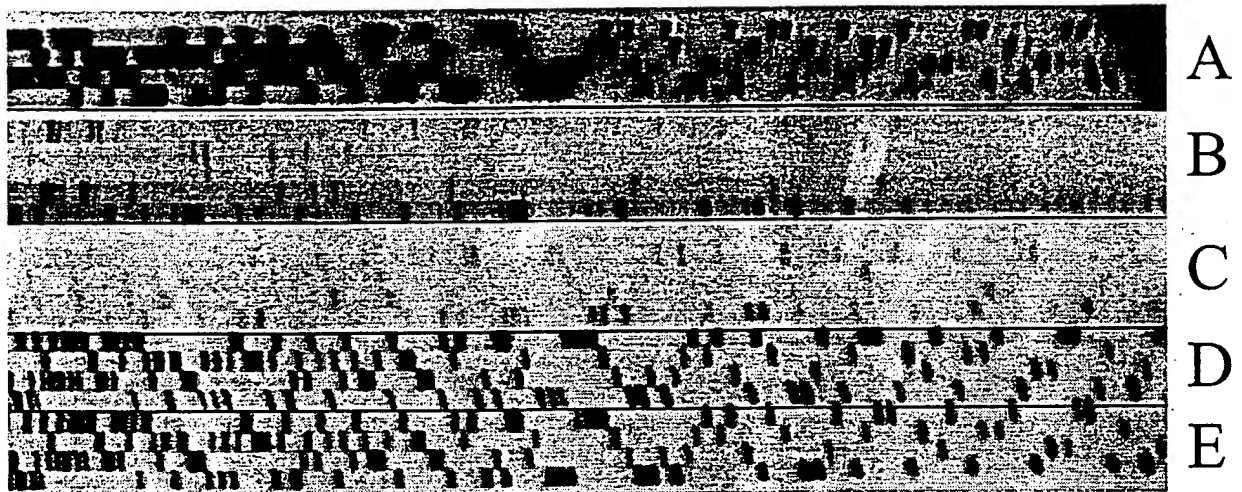


Figure 6

Sequencing with Dye-labeled Dideoxynucleotides

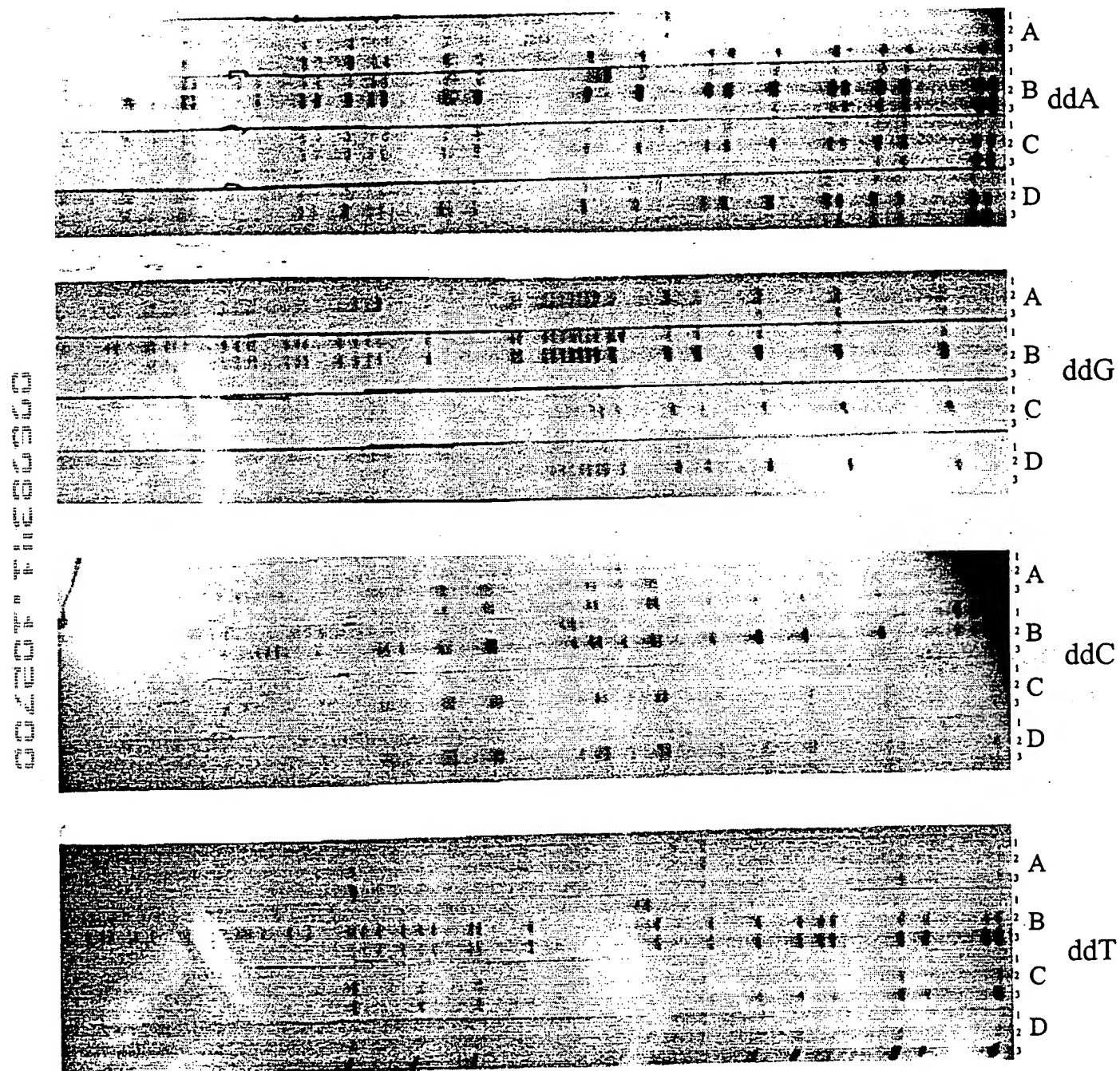


Figure 7

Sequencing with the P410L, A485T Double Mutant
and α - ^{33}P Dideoxynucleotides

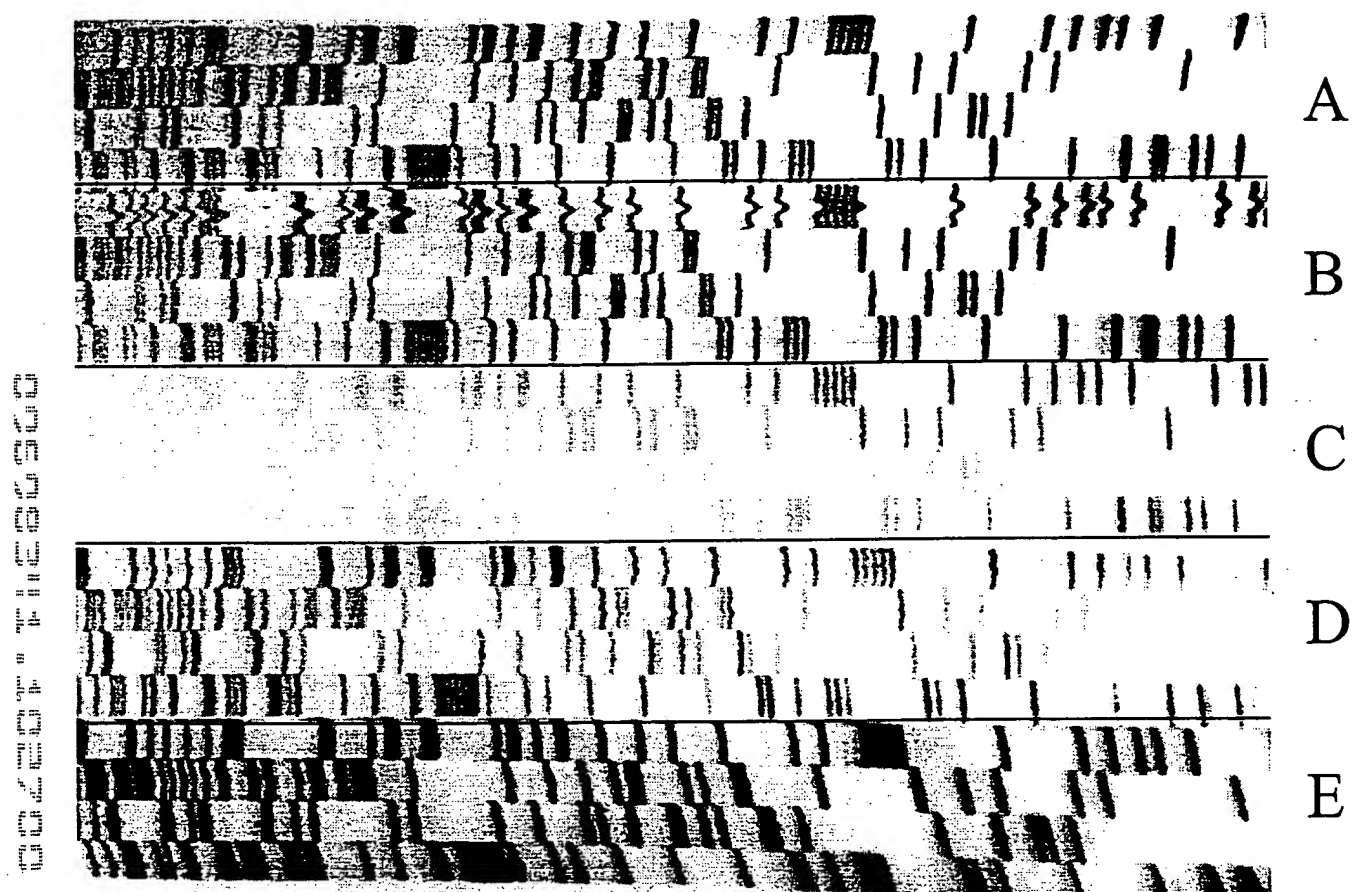
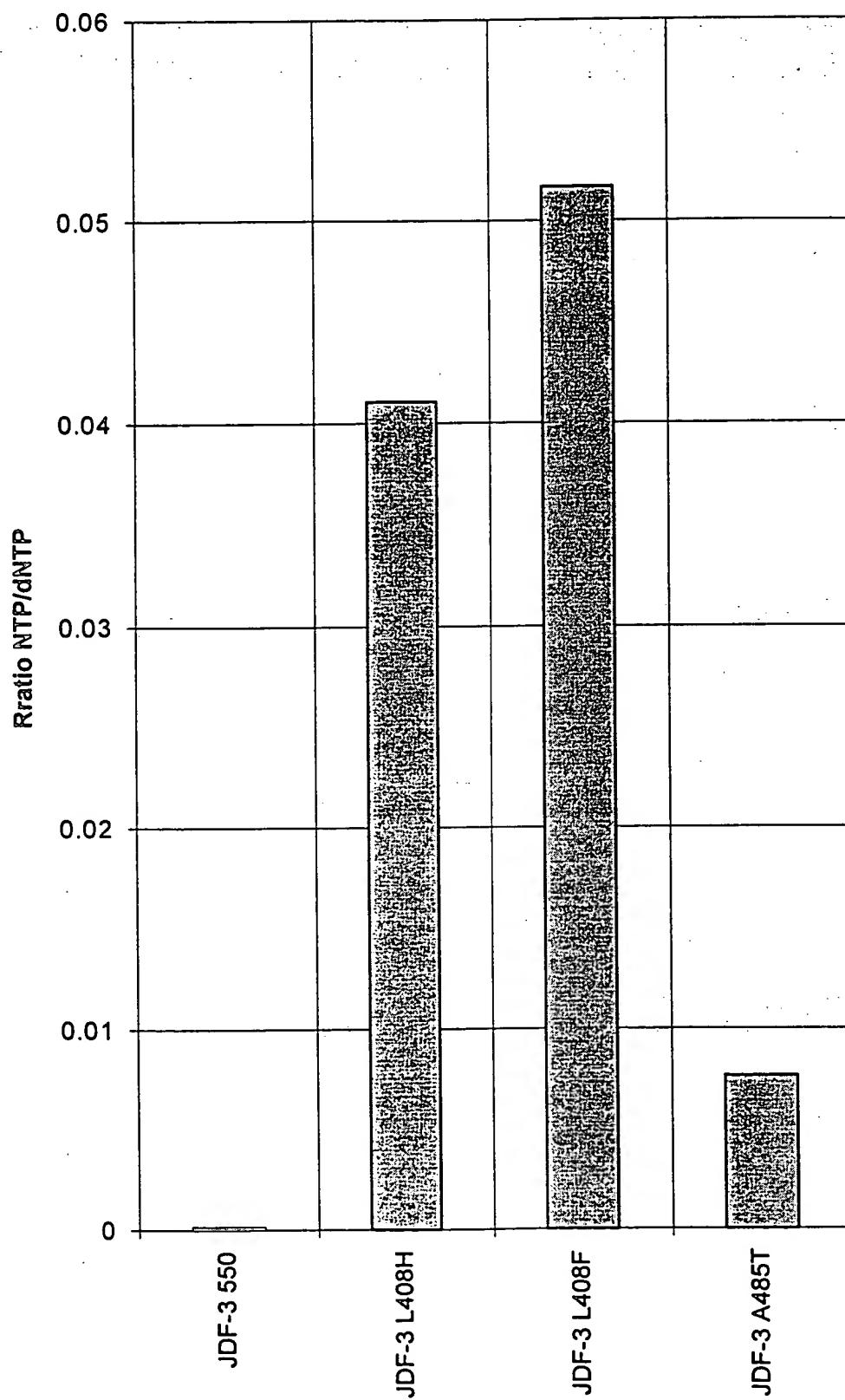


Figure 8

Figure 9



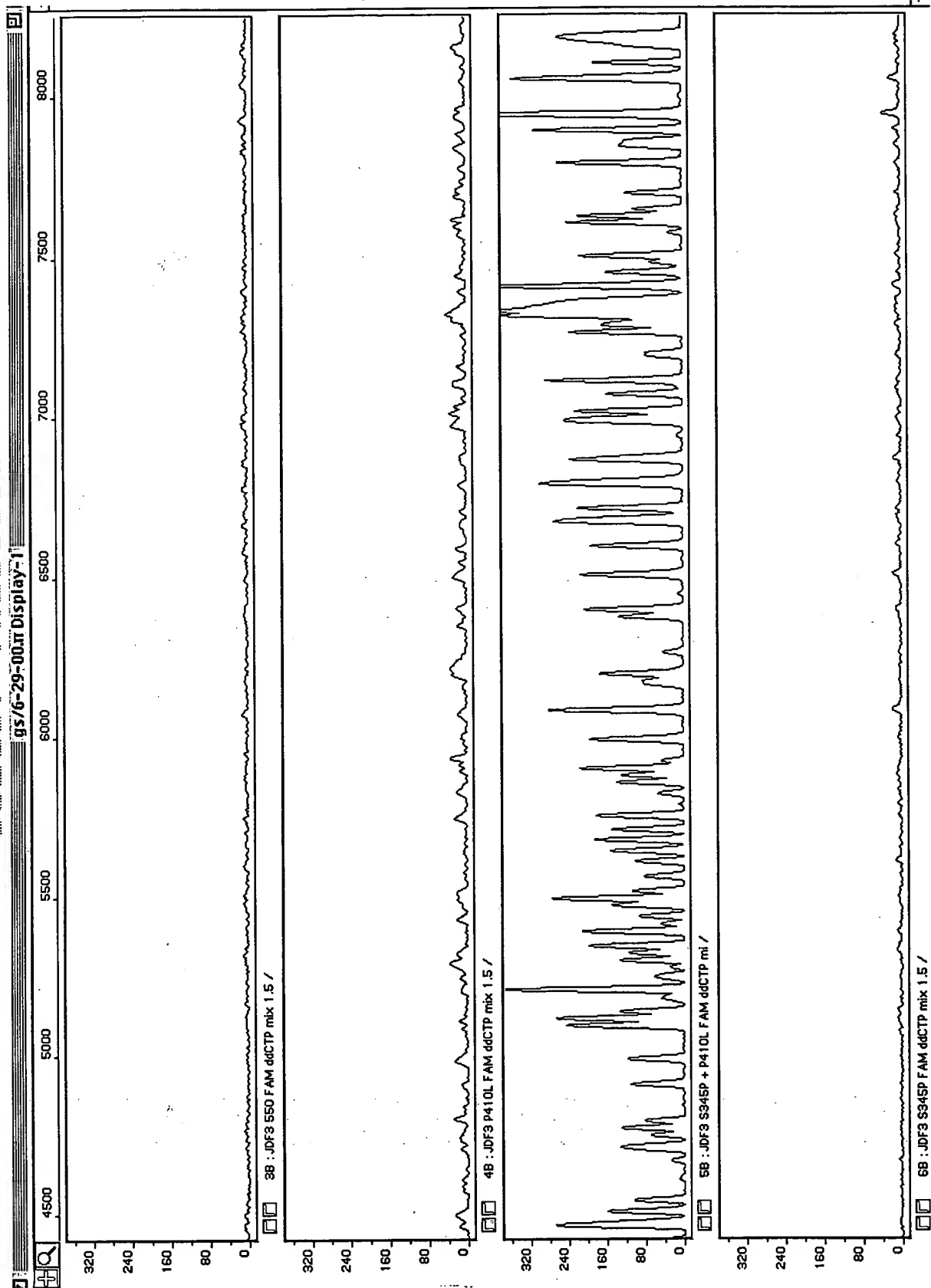


Figure 10

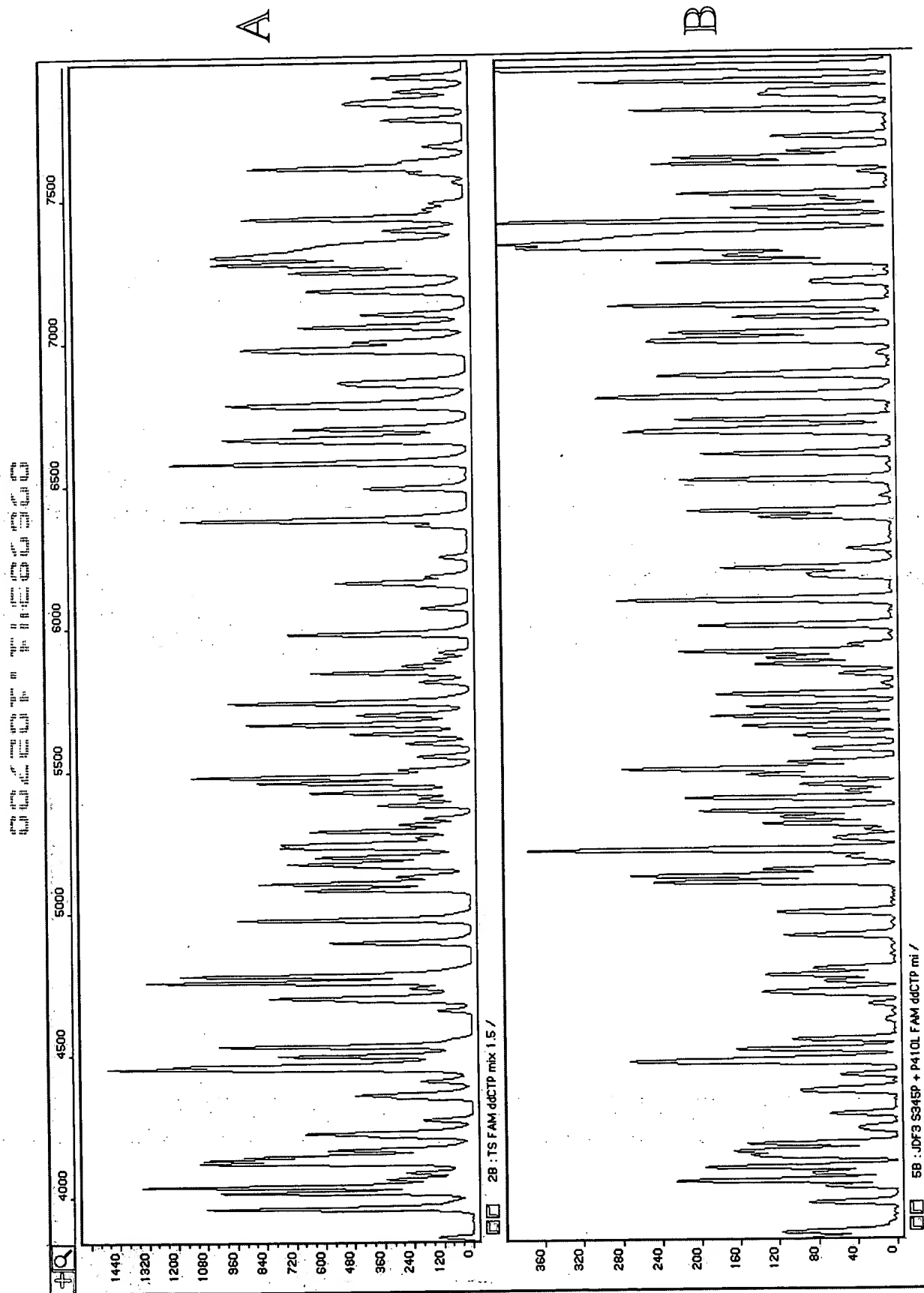


Figure 11

^{33}P - TAACGTTGGGGGGGGGGCA →
 TGCAACCCCCCCCCCGTAT

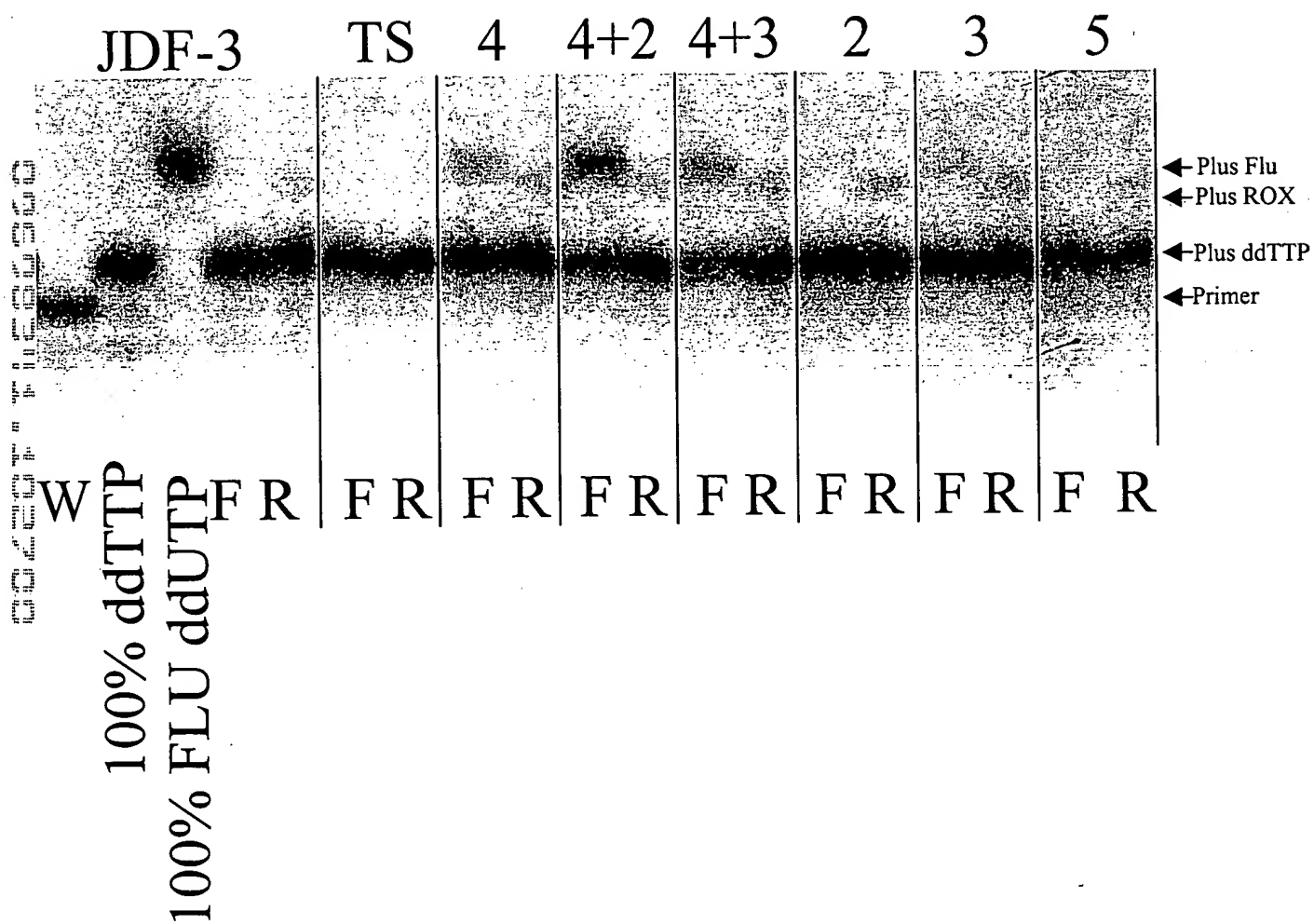


Figure 12

Flu ddUTP signal/ddTTP signal

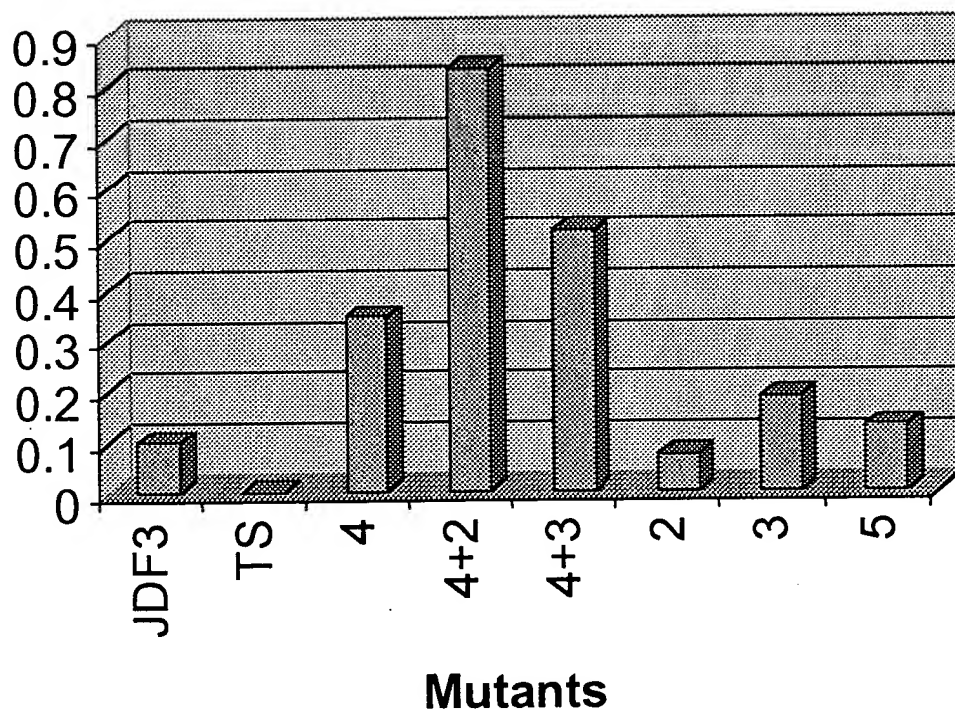


Figure 13

4	1	-----LVXNAXSTGNLVEWFLLRK
10	1	-----VWDVSRSTGNLVEWFLLRK
13	1	-----VWDVSRSTGNLVEWFLLRK
16	1	-----VWDVSRSTGNLVEWFLLRK
18	1	-----VWDVSRSTGNLVEWFLLRK
19	1	-----VWDVSRSTGNLVEWFLLRK
28	1	-----VWDVSRSTGNLVEWFLLRK
34	1	-----VWDVSRSTGNLVEWFLLRK
41	1	-----VWDVSRSTGNLVEWFLLRK
33	1	-----VWDVSRSTGNLVEWFLLRK
48	1	-----YWSXPXLRTGNLVEWFLLRK
55	1	-----VIGTXPRSTGNLVEWFLLRK
64	1	-----XXXFWDSRSTGNLVEWFLLRK
Jdf3	301	TGEGLERVARYSMEDARVTYELGREFFPMEAQLSRLIGQGLVWDVSRSTGNLVEWFLLRK

4	20	AYERNELAPNKPDERELARRRGYAGGYVKEPERGLWDNIVYLDFRSLYPSIIITHNVSP
10	21	AYERNELAPNKPDERELARRRGYAGGYVKEPERGLWDNIVYLDFRSLYPSIIITHNVSP
13	21	AYERNELAPNKPDERELARRRGYAGGYVKEPERGLWDNIVYLDFRSLYPSIIITHNVSP
16	21	AYERNELAPNKPDERELARRRGYAGGYVKEPERGLWDNIVYLDFRSLYPSIIITHNVSP
18	21	AYERNELAPNKPDERELARRRGYAGGYVKEPERGLWDNIVYLDFRSLYPSIIITHNVSP
19	21	AYERNELAPNKPDERELARRRGYAGGYVKEPERGLWDNIVYLDFRSLYPSIIITHNVSP
28	21	AYERNELAPNKPDERELARRRGYAGGYVKEPERGLWDNIVYLDFRSLYPSIIITHNVSP
34	21	AYERNELAPNKPDERELARRRGYAGGYVKEPERGLWDNIVYLDFRSLYPSIIITHNVSP
41	21	AYERNELAPNKPDERELARRRGYAGGYVKEPERGLWDNIVYLDFRSLYPSIIITHNVSP
33	21	AYERNELAPNKPDERELARRRGYAGGYVKEPERGLWDNIVYLDFRSLYPSIIITHNVSP
48	21	AYERNELAPNKPDERELARRRGYAGGYVKEPERGLWDNIVYLDFRSLYPSIIITHNVSP
55	22	AYERNELAPNKPDERELARRRGYAGGYVKEPERGLWDNIVYLDFRSLYPSIIITHNVSP
64	24	AYERNELAPNKPDERELARRRGYAGGYVKEPERGLWDNIVYLDFRSLYPSIIITHNVSP
Jdf3	361	AYERNELAPNKPDERELARRRGYAGGYVKEPERGLWDNIVYLDFRSLYPSIIITHNVSP

4	80	DTLNREGCRSYDVAPEVGHKFKCDFPGFIPSLLGNNLEERQKIKRKMKATLDPLEKNLLD
10	81	DTLNREGCRSYDVAPEVGHKFKCDFPGFIPSLLGNNLEERQKIKRKMKATLDPLEKNLLD
13	81	DTLNREGCRSYDVAPEVGHKFKCDFPGFIPSLLGNNLEERQKIKRKMKATLDPLEKNLLD
16	81	DTLNREGCRSYDVAPEVGHKFKCDFPGFIPSLLGNNLEERQKIKRKMKATLDPLEKNLLD
18	81	DTLNREGCRSYDVAPEVGHKFKCDFPGFIPSLLGNNLEERQKIKRKMKATLDPLEKNLLD
19	81	DTLNREGCRSYDVAPEVGHKFKCDFPGFIPSLLGNNLEERQKIKRKMKATLDPLEKNLLD
28	81	DTLNREGCRSYDVAPEVGHKFKCDFPGFIPSLLGNNLEERQKIKRKMKATLDPLEKNLLD
34	81	DTLNREGCRSYDVAPEVGHKFKCDFPGFIPSLLGNNLEERQKIKRKMKATLDPLEKNLLD
41	81	DTLNREGCRSYDVAPEVGHKFKCDFPGFIPSLLGNNLEERQKIKRKMKATLDPLEKNLLD
33	81	DTLNREGCRSYDVAPEVGHKFKCDFPGFIPSLLGNNLEERQKIKRKMKATLDPLEKNLLD
48	81	DTLNREGCRSYDVAPEVGHKFKCDFPGFIPSLLGNNLEERQKIKRKMKATLDPLEKNLLD
55	82	DTLNREGCRSYDVAPEVGHKFKCDFPGFIPSLLGNNLEERQKIKRKMKATLDPLEKNLLD
64	84	DTLNREGCRSYDVAPEVGHKFKCDFPGFIPSLLGNNLEERQKIKRKMKATLDPLEKNLLD
Jdf3	421	DTLNREGCRSYDVAPEVGHKFKCDFPGFIPSLLGNNLEERQKIKRKMKATLDPLEKNLLD

Figure 14

4	140	YRQRAIKILANSYYGYG	GYARARWYCRECAESVTAWGREYIEMVIRELEEKFGFKVLYAD
10	141	YRQRAIKILANSYYGYG	GYARARWYCRECAESVTAWGREYIEMVIRELEEKFGFKVLYAD
13	141	YRQRAIKILANSYYGYG	GYARARWYCRECAESVTAWGREYIEMVIRELEEKFGFKVLYAD
16	141	YRQRAIKILANSYYGYG	GYARARWYCRECAESVTAWGREYIEMVIRELEEKFGFKVLYAD
18	141	YRQRAIKILANSYYGYG	GYARARWYCRECAESVTAWGREYIEMVIRELEEKFGFKVLYAD
19	141	YRQRAIKILANSYYGYG	GYARARWYCRECAESVTAWGREYIEMVIRELEEKFGFKVLYAD
28	141	YRQRAIKILANSYYGYG	GYARARWYCRECAESVTAWGREYIEMVIRELEEKFGFKVLYAD
34	141	YRQRAIKILANSYYGYG	GYARARWYCRECAESVTAWGREYIEMVIRELEEKFGFKVLYAD
41	141	YRQRAIKILANSYYGYG	GYARARWYCRECAESVTAWGREYIEMVIRELEEKFGFKVLYAD
33	141	YRQRAIKILANSYYGYG	GYARARWYCRECAESVTAWGREYIEMVIRELEEKFGFKVLYAD
48	141	YRQRAIKILANSYYGYG	GYARARWYCRECAESVTAWGREYIEMVIRELEEKFGFKVLYAD
55	142	YRQRAIKILANSYYGYG	GYARARWYCRECAESVTAWGREYIEMVIRELEEKFGFKVLYAD
64	144	YRQRAIKILANSYYG	NYGYARARWYCRECAESVTAWGREYIEMVIRELEEKFGFKVLYAD
Jdf3	481	YRQRAIKILANSYYGYG	GYARARWYCRECAESVTAWGREYIEMVIRELEEKFGFKVLYAD

4	200	TDGLHATIPGADAETVKKKAMEFLNYINPKLPGLLELEYEGFYVRGFFVTKKKYAVIDEE
10	201	TDGLHATIPGADAETVKKKAMEFLNYINPKLPGLLELEYEGFYVRGFFVTKKKYAVIDEE
13	201	TDGLHATIPGADAETVKKKAMEFLNYINPKLPGLLELEYEGFYVRGFFVTKKKYAVIDEE
16	201	TDGLHATIPGADAETVKKKAMEFLNYINPKLPGLLELEYEGFYVRGFFVTKKKYAVIDEE
18	201	TDGLHATIPGADAETVKKKAMEFLNYINPKLPGLLELEYEGFYVRGFFVTKKKYAVIDEE
19	201	TDGLHATIPGADAETVKKKAMEFLNYINPKLPGLLELEYEGFYVRGFFVTKKKYAVIDEE
28	201	TDGLHATIPGADAETVKKKAMEFLNYINPKLPGLLELEYEGFYVRGFFVTKKKYAVIDEE
34	201	TDGLHATIPGADAETVKKKAMEFLNYINPKLPGLLELEYEGFYVRGFFVTKKKYAVIDEE
41	201	TDGLHATIPGADAETVKKKAMEFLNYINPKLPGLLELEYEGFYVRGFFVTKKKYAVIDEE
33	201	TDGLHATIPGADAETVKKKAMEFLNYINPKLPGLLELEYEGFYVRGFFVTKKKYAVIDEE
48	201	TDGLHATIPGADAETVKKKAMEFLNYINPKLPGLLELEYEGFYVRGFFVTKKKYAVIDEE
55	202	TDGLHATIPGADAETVKKKAMEFLNYINPKLPGLLELEYEGFYVRGFFVTKKKYAVIDEE
64	204	TDGLHATIPGADAETVKKKAMEFLNYINPKLPGLLELEYEGFYVRGFFVTKKKYAVIDEE
Jdf3	541	TDGLHATIPGADAETVKKKAMEFLNYINPKLPGLLELEYEGFYVRGFFVTKKKYAVIDEE

4	260	GKITTRGLEIVRRDWSEIAKETQARVLEAILRHGDVEEAVRIVREVTEKLSKYEVPPEKL
10	261	GKITTRGLEIVRRDWSEIAKETQARVLEAILRHGDVEEAVRIVREVTEKLSKYEVPPEKL
13	261	GKITTRGLEIVRRDWSEIAKETQARVLEAILRHGDVEEAVRIVREVTEKLSKYEVPPEKL
16	261	GKITTRGLEIVRRDWSEIAKETQARVLEAILRHGDVEEAVRIVREVTEKLSKYEVPPEKL
18	261	GKITTRGLEIVRRDWSEIAKETQARVLEAILRHGDVEEAVRIVREVTEKLSKYEVPPEKL
19	261	GKITTRGLEIVRRDWSEIAKETQARVLEAILRHGDVEEAVRIVREVTEKLSKYEVPPEKL
28	261	GKITTRGLEIVRRDWSEIAKETQARVLEAILRHGDVEEAVRIVREVTEKLSKYEVPPEKL
34	261	GKITTRGLEIVRRDWSEIAKETQARVLEAILRHGDVEEAVRIVREVTEKLSKYEVPPEKL
41	261	GKITTRGLEIVRRDWSEIAKETQARVLEAILRHGDVEEAVRIVREVTEKLSKYEVPPEKL
33	261	GKITTRGLEIVRRDWSEIAKETQARVLEAILRHGDVEEAVRIVREVTEKLSKYEVPPEKL
48	261	GKITTRGLEIVRRDWSEIAKETQARVLEAILRHGDVEEAVRIVREVTEKLSKYEVPPEKL
55	262	GKITTRGLEIVRRDWSEIAKETQARVLEAILRHGDVEEAVRIVREVTEKLSKYEVPPEKL
64	264	GKITTRGLEIVRRDWSEIAKETQARVLEAILRHGDVEEAVRIVREVTEKLSKYEVPPEKL
Jdf3	601	GKITTRGLEIVRRDWSEIAKETQARVLEAILRHGDVEEAVRIVREVTEKLSKYEVPPEKL

Figure 15